

REMARKS

No claims have been amended by this paper. Claims 1-23 are pending.

The examiner restricted claims 1-14, 22, and 23 in Group I as drawn to a product, and claims 15-21 as drawn to a process. Applicant confirms the provisional election of Group I claims without traverse. Claims 15-21 are withdrawn from further consideration.

Applicant amended the specification at paragraph [0007] where page numbers were inadvertently omitted. Applicant notes the examiner's objection to the drawings. Applicant will amend the drawings upon receipt of a notice of allowance.

Applicant agrees that 54.5 to 57.0 wt% Ni translates to 49.9 to 52.0 at% Ni, as the examiner has specified in the present Office action.

The examiner rejected claims 1-14, 22, and 23 under 35 U.S.C. § 112, second paragraph, as indefinite regarding the expression "in an ingot state." Applicant respectfully disagrees with this rejection. When the claim recites "a core including a binary, nickel-titanium, superelastic alloy in an ingot state," the claim defines when the alloy is in the ingot state, it has these characteristics, which when processed, will produce wire, ribbon, sheet, or tubing having high fatigue life. This is supported by applicant's specification at paragraph [0023], for example. A metallurgist would understand that the "ingot state" is a milestone or signpost in the processing of the alloy that is met in its final form in order to reach a desired finished property, here long fatigue life.

Further, the preamble here is providing background to the claims. So during processing and depending on what steps are taken, the ingot may be transformed into a wire, ribbon, sheet, or tubing. If it would help resolve the matter, applicant proposes amending the preamble to replace "wire, ribbon, sheet or tubing" with "product." Applicant is further open to any suggestion by the examiner. At present, however, applicant believes all claims fully comply with 35 U.S.C. § 112, second paragraph.

Claims 1-4, and 9 were rejected under 35 U.S.C. § 102(b) as anticipated by or in the alternative, under 35 U.S.C. §103(a) as obvious over Beard (U.S. Published Patent Application No. 2002/0005047). This rejection is respectfully traversed.

The examiner in the rejection alleges that Beard in paragraph [0007] teaches an A(f) temperature (“A(f) = +5 degrees C \pm 5”) for Alloy #1. Beard, however, fails to explain at what stage this A(f) temperature is defined for the nitinol alloy, such as when it is in ingot state, after cold work, after anneal, or in the finished wire form. As applicant’s specification teaches in paragraph [0028], heat treatment and cold work *can change the transformation temperature* of the nitinol alloy. Thus, the A(f) temperature taught by Alloy #1 of Beard could be at any instant of the processing of the nitinol alloy. It is known that differences in A(f) at these varying stages have a profound effect on the finished product. Most likely, the Beard A(f) temperature defined for Alloy #1 is for the *finished wire* since the reference is directed to jewelry making and is only interested in the finished wire form. Thus, a jewelry maker or designer would order the nitinol wire from a supplier in finished form and would not be interested in the A(f) temperature at the ingot state.

On the other hand, the A(f) temperature recited in claim 1 is for the ingot state, hence the expression “ingot A_f” is used. Applicant’s specification at paragraph [0027] explains that the “ingot transition temperature is indicative of the chemical composition of the alloy in the ingot state.” That is, it is the A(f) transformation temperature when the alloy is in an ingot state. Hence, this ingot transformation temperature within the claimed range is not taught or suggested by Beard.

The examiner states that the reference does not teach (in addition to the ingot A(f) not being disclosed as noted by applicant) the claimed cold work and anneal cycle. The examiner further holds that for claim 1, as a product-by-process claim, applicant needs to show any process steps resulting in a product materially different from the prior art.

Here, applicant asserts that a nitinol alloy with the ingot A(f), the one cold work and full anneal cycle, and with a final cold work of less than about 30% as specified, the resulting alloy will have a very high fatigue life (see, applicant's specification at para. 0033, "a 37 % increase in fatigue resistance over a conventional nitinol wire"). These process steps therefore result in a product with materially different fatigue resistance from the prior art, where that prior art encompasses the Beard Alloy #1 since the reference is not directed at improving fatigue life.

Since the reference does not teach or suggest the claimed A(f) range, cold work and anneal cycle, and the final cold work step of less than 30%, claim 1 is not anticipated by this reference; and since not all limitations are taught or suggested by the reference, the examiner has not established *prima facie* obviousness. Applicant respectfully requests that the rejections be withdrawn.

Claims 7, 8, and 10-14 were rejected under 35 U.S.C. § 103(a) as obvious over Beard. This rejection is respectfully traversed.

Claims 7 and 8 depend on claim 1. For the reasons given above to overcome the rejection with respect to claim 1, applicant believes dependent claims 7 and 8 are likewise patentable over the cited reference.

Regarding dependent claims 7, 8, and independent claim 10, and the amounts recited for Fe, Cu, O, C, and H, and any other single trace elements, these ranges limit the amount of "impurities" in the nitinol alloy to achieve the long fatigue life. This is explained in applicant's specification at paragraph [0029]. It is understood that greater impurity amounts imply that the fatigue life of the finished nitinol product is reduced. Hence, these limitations should be given patentable weight. Beard does not address improving fatigue life of nitinol so it does not teach or suggest these impurity ranges.

At least for the above reasons, applicant respectfully contends that the examiner has not established *prima facie* obviousness of the rejected claims since not all limitations are taught or suggested. This rejection should be withdrawn.

Claims 5, 22, and 23 were rejected under 35 U.S.C. § 103(a) as obvious over Beard and in view of Ishibe (U.S. Patent No. 5,230,348). This rejection is respectfully traversed.

Claim 5 depends on claim 1. Applicant contends that claim 1 provides “an ingot A_f at approximately -15 °C ± 25 °C,” a cold work and anneal cycle, and a final cold work of less than 30%, all of which are not disclosed or suggested by Beard or Ishibe.

Independent claim 22 provides “an ingot A_f at approximately -15 °C ± 25 °C” which is not disclosed or suggested by Beard or Ishibe. Dependent claim 23 is patentable over the art for the same reason. At least for the above reasons, applicant respectfully contends that the examiner has not established *prima facie* obviousness of the rejected claims since not all limitations are taught or suggested.

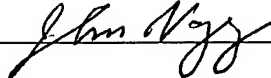
Claim 6 was rejected under 35 U.S.C. § 103(a) as obvious over Beard alone or in view of either Iwai et al. (U.S. Patent No. 5,334,294) or Wang et al. (U.S. Patent No. 6,375,826). This rejection is respectfully traversed.

Claim 6 depends on base claim 1, which applicant contends is patentable over Beard for the reasons given above. According to the examiner, Iwai and Wang teach electropolishing wires made from nitinol alloy, but add nothing to Beard regarding an ingot A(f) temperature, a cold work and full anneal cycle, and a final cold work of less than 30%. Hence, at least for the above reasons, applicant respectfully contends that the examiner has not established *prima facie* obviousness of the rejected claim since not all limitations are taught or suggested.

In view of the foregoing, all claims are now in condition for allowance.
Reexamination and reconsideration of the application are respectfully requested and
allowance at an early date is solicited.

Respectfully submitted,

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